UTAH DEPARTMENT OF TRANSPORTATION

STORM WATER MANAGEMENT PLAN

UPDES PHASE II

Submitted to:

STATE OF UTAH
DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF WATER QUALITY

September 2006

Modifications to UDOTs Storm Water Management Plan

Mod #	Brief Description	Approved By	Date
1	UDOT Environmental Protection Specification 01355 was revised.	UDOT Standards Committee	Sept. 2005
2	UDOT Std drawings EN1-EN7 for erosion and sediment control measures were modified.	UDOT Standards Committee	Sept. 2005
3	SWPPP Standard Summary Sheet was up-dated and clarified.	UDOT Standards Committee	Sept. 2005
4	UDOT Std Specification for Temporary Environmental Controls 01571 was revised.	UDOT Standards Committee	June 2005
5	New Outline developed for SWPPPs	UDOT Env. Services	Jan. 2007
6	SWPPPs compiled by UDOT and supplied to contractors for use on projects	UDOT Env. Services	Jan. 2007
7	UDOT Spill Prevention & Response Plan added to SWPPPs	UDOT Env. Services	Jan. 2007
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UTAH DEPARTMENT OF TRANSPORTATION
STORM WATER MANAGEMENT PLAN

INTRODUCTION

This Storm Water Management Plan is submitted to the State of Utah, Division of Water Quality for the discharge of municipal storm water under Phase II of the Utah Pollutant Discharge Elimination System. This Storm Water Management Plan applies to UDOT storm water conveyance systems in areas designated by the EPA. These include small municipalities and other areas listed below:

Small Municipalities:

Cache County
Hyde Park
Logan
Millville
North Logan
Providence
River Heights
Smithfield

Davis County
Bountiful
Centerville
Clearfield
Clinton
Farmington
Fruit Heights
Kaysville
Layton
North Salt Lake
Syracuse
West Bountiful
West Point
Woods Cross

Salt Lake County
Bluffdale
Draper

Salt Lake County Cont.
Holladay
Midvale
Murray
Riverton
Salt Lake City
Sandy
South Jordan
South Salt Lake
Taylorsville
West Jordan
West Valley City

Utah County
American Fork
Cedar Hills
Highland
Lehi
Lindon
Mapleton
Orem
Pleasant Grove
Provo
Spanish Fork
Springville

Weber County
Farr West
Harrisville
North Ogden
Ogden
Pleasant View
Riverdale
Roy
South Ogden
South Weber
Sunset
Uintah
Washington Terrace

Washington County
Ivins
Santa Clara
Washington City
St. George City

Other Designated Areas:

Brigham City
Cedar City
Ogden
Tooele

DESCRIPTION

This Storm Water Management Plan is designed to limit the discharge of pollutants to UDOT's storm water systems to the maximum extent practicable (MEP). This plan consists of various best management practices (BMP's) that help to achieve the goals outlined in 40CFR 122.34(b), Section 402(p)(3)(B) of the Federal Clean Water Act and State of Utah Storm Water Regulations (UAC R317-8-3.8).

SWMP Control Measures Required for Phase II Designated Areas and Municipalities
This Storm Water Management Plan addresses the six minimum control measures set forth by the EPA through the State Division of Water Quality. A separate chapter is dedicated to each control measure listed below, outlining BMP's that describe specific activities, procedures, training and other actions that help to prevent and reduce pollution to waters of the state.

- Public Education and Outreach
- Public Involvement/Participation
- Illicit Discharge Detection and Elimination
- Construction Site Storm Water Runoff Control
- Post Construction Storm Water Management in New Development and Redevelopment
- Pollution Prevention/Good Housekeeping for Municipal Operations

SWMP Control Measures Required for All Other Areas Statewide
For statewide locations other than Phase II municipalities and areas, the chapters listed below are applicable. Best Management Practices described in these chapters may be dependent on area of disturbance, hydrologic characteristics, topography or geography.

- Construction Site Storm Water Runoff Control
- Post Construction Storm Water Management in New Development and Redevelopment
- Pollution Prevention/Good Housekeeping for Municipal Operations

SWMP RESPONSIBILITY AND RESOURCES

Under the authority granted by the Utah Code Volume 2, Title 27 and Volume 3, Title 63, UDOT is responsible for design, construction and maintenance of all state highway systems, including drainage systems. UDOT shall provide adequate finances, staff, equipment and support capabilities to implement the control measures outlined in the storm water management plan.

CHAPTER 1

PUBLIC EDUCATION AND OUTREACH

OBJECTIVE
Provide information and guidance to the public on issues related to storm water quality.

BEST MANAGEMENT PRACTICES
The BMP's in this chapter describe techniques to inform the public on the effects of pollution to storm water and ways to reduce pollutants from being discharged to storm drain systems. Several BMP's focus on informing and educating the public on issues relating to storm water quality.

List of BMP's
- Storm Water Displays at Public Meetings
- Television Commercials on Storm Water
- Storm Water Information on UDOT's Web Site

BMP - Storm Water Displays at Public Meetings

Objective

Increase public awareness of storm water, the effects of pollutants and ways to minimize the discharge of pollutants to storm drain systems.

Description

On many projects, public hearings and meetings are necessary to provide information and opportunities for the public to give input. Storm water informational displays will be provided at public meetings and public hearings held for selected UDOT projects. The displays will briefly explain what storm water is and how pollutants from storm water can impact the aquatic environment. The displays will also describe how to properly dispose of common household wastes and include steps to reduce the discharge of pollutants to rivers, streams and storm water facilities. Educational materials such as tabloids, handouts, magnets, pads and pencils would be available for the public to take home. In addition, comment sheets would be provided to allow the public an opportunity to submit their input.

Decision Process

Those who attend meetings and public hearings will also have an opportunity to view a display and obtain educational materials on storm water. A table top display at these meetings is an effective way to provide information on storm water to the public. The target audience for this BMP includes residents, business and property owners, and all other interested individuals and groups that attend public meetings for transportation projects. For projects that are likely to involve minority populations, information notices will be sent to local papers and community centers that serve these groups. Target pollutant sources include litter, common household hazardous wastes, vehicle fluids and lawn care chemicals.

UDOT Region environmental staff would be present at the public meetings and hearings to provide information and answer questions on storm water issues and methods of proper waste disposal. Displays would be provided at public meetings and hearings for major projects involving the preparation of Environmental Assessments (EA's) and Draft Environmental Impact Statements (DEIS's).

Staffing

Storm water displays will be set up and staffed by at least one individual from the UDOT Region environmental section.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
November 2003	Develop Display Materials	Approval of Materials by DWQ
February 2004	Obtain Display Panels	N/A
March 2004 - 2008	Provide Storm Water Displays at Public Meetings for EA's and EIS's	Document number of displays provided

BMP - Television Commercials on Storm Water

Objective

Increase public awareness of storm water and the effects of common pollutants. Inform and educate the public on ways to minimize the discharge of pollutants to storm drain systems.

Description

Television commercials that focus on storm water quality are broadcast on major networks to audiences statewide. These commercials describe storm water, common pollutants, and ways the public can prevent and minimize pollutants from being discharged to storm drain systems.

UDOT provides yearly financial support to Salt Lake County as part of a current Public Education and Outreach Program. Salt Lake County hired a consultant that developed and produced the TV commercials as well as other mass educational materials.

Decision Process

Television commercials are an effective means to communicate information to a statewide audience. Target audiences include all residents, business and property owners throughout Utah. Target pollution sources include common household hazardous wastes and litter, vehicle fluids/wash water and lawn care chemicals.

Staffing

This BMP requires yearly financial support to Salt Lake County. Except for general coordination activities, no UDOT staffing resources are required.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Provide TV commercials to statewide audiences.	Document number of TV commercials provided.

BMP - Storm Water Information on UDOT's Web Site

Objective

Increase public awareness of storm water and the effects of pollutants. Educate the public on ways to minimize the discharge of pollutants to storm drain systems.

Description

Provide on-line information that explains what storm water is and how pollutants from storm water can impact the aquatic environment. Information directly on the web site or on web links would describe how to properly dispose of common household wastes and include steps to reduce the discharge of pollutants to rivers, streams and storm water facilities. In addition, the web site will provide the opportunity for the public to email information to staff on potential problems, illicit discharges or spills.

Decision Process

Many highway users access UDOT's web site to obtain information on transportation projects and traffic conditions. Web based information is an effective way to inform and educate the public on issues regarding storm water quality and the ultimate destination of storm water runoff

The target audience for this BMP includes residents, business and property owners, and all other interested individuals and groups that may desire to obtain transportation information via the world wide web. Target pollutant sources described will include litter, common household hazardous wastes, vehicle fluids and lawn care chemicals.

Measurable Goals

Goal - Provide storm water information and links that provide a description of storm water, common pollutants and measures to minimize pollutant discharges to storm drain systems on UDOT's web site by June 2004.

Staffing

One member of the Environmental Services section will work with the Web Manager to develop and add storm water information to the web site.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
May 2004	Develop web materials	N/A
July 2004 - 2008	Provide Storm Water Displays informational material on UDOT's environmental web site.	Document number of web site visits.

CHAPTER 2

PUBLIC INVOLVEMENT AND PARTICIPATION

OBJECTIVE

Provide the public an opportunity to be involved and participate in UDOT programs related to storm water quality.

BEST MANAGEMENT PRACTICES

The BMP's in this chapter describe techniques to involve the public in programs to reduce pollutants from being discharged to storm drain systems. BMP's focus on involving the public in various programs designed to reduce pollutants from being discharged into storm drain systems.

List of BMP's

- Storm Water Displays at Public Meetings
- Storm Water Comment Opportunity via UDOT's Web Site
- Adopt-A-Highway Litter Cleanup Program

BMP - Storm Water Displays at Public Meetings

Objective
Provide the public an opportunity to submit comments and suggestions regarding UDOT storm water management techniques.

Description
Storm water informational displays will be provided at public meetings and public hearings held for UDOT projects. The displays will briefly explain what storm water is and how pollutants from storm water can impact the aquatic environment. The displays will describe how UDOT manages storm water on projects and how UDOT minimizes the discharge of pollutants to downstream water resources. A UDOT staff member will be available to answer questions and receive comments or suggestions the public may have about storm water management. Comment sheets will be provided to allow the public an opportunity to submit their input and suggestions in writing.

Decision Process
Those who attend meetings and public hearings will also have an opportunity to view a display and obtain educational materials on storm water. A table top display at these meetings is an effective way to provide information on storm water to the public and allow the public an opportunity to provide input and suggestions. The target audience for this BMP includes residents, business and property owners, and all other interested individuals and groups that attend public meetings for transportation projects. For projects that are likely to involve minority populations, information notices will be sent to local papers and community centers that serve these groups. Target pollutant sources include litter, common household hazardous wastes, vehicle fluids and lawn care chemicals.

UDOT Region environmental staff would be present at the public meetings and hearings to provide information and answer questions on storm water issues and methods of proper waste disposal. Displays would be provided at public meetings and hearings for projects involving the preparation of Environmental Assessments (EAs) and Draft Environmental Impact Statements (DEISs).

Staffing
Storm water displays will be set up and staffed by at least one individual from the UDOT region environmental section.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
November 2003	Develop Display Materials	Approval of Materials by DWQ
January 2004	Obtain Display Panels	N/A
March 2004 - 2008	Provide Storm Water comment opportunity at Public Meetings for EAs and EISs	Document number of displays provided
March 2004 -	Respond to public comments	

2008	within 2 weeks	Document comments and responses

BMP - Storm Water Comment Opportunity via UDOT's Web Site

Objective
Provide an on-line opportunity to the public to submit comments and suggestions regarding storm water issues.

Description
Storm water Information directly on UDOT's web site or on web links would describe how storm water is managed on transportation projects. UDOT's web site will provide the opportunity for the public to comment on these management strategies and email suggestions to UDOT staff. The web site will also provide an e-mail opportunity and telephone number/contact person for the public to share information on potential storm water problems, illicit discharges or spills.

Decision Process
Many highway users access UDOT's web site to obtain information on transportation projects and traffic conditions. Web based information is an effective way to inform and educate the public on issues regarding storm water quality and management techniques.

The target audience for this BMP includes residents, business and property owners, and all other interested individuals and groups that may desire to obtain transportation information via the world wide web. Target pollutant sources described will include litter, common household hazardous wastes, vehicle fluids and lawn care chemicals.

Measurable Goals
Goal - Provide a written response to all who submit comments within two weeks.

Staffing
One member of the Environmental Services section will work with the Web Manager to develop and add storm water information to the web site.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
May 2004	Develop web materials	N/A
July 2004 - 2008	Provide Storm Water Displays informational material on UDOT's environmental web site.	Document number of web site visits.
July 2004 - 2008	Provide a opportunity to comment on line	Document number of comments submitted.

BMP - Adopt-A-Highway Litter Cleanup Program

Objective
Provide the public an opportunity to be involved and participate in UDOT's litter cleanup program on state roadways and highways. The objective of this BMP is to prevent litter and associated pollutants from being discharged to downstream drainage facilities and receiving waters.

Description
The "Adopt a Highway" program is a cleanup effort by volunteers from various groups who collect and remove litter on a specific segment of interstate highway or local state roadway. UDOT provides litter bags and collects the bags and disposes of the waste material at a local landfill.

Decision Process
The "Adopt a Highway" program currently has approximately 800 groups that participate. Each group involved in the program collects litter on a two mile segment of roadway right of way a minimum of three times per year.

By participating in the Adopt-A-Highway program, members of the public learn first hand, the effects of litter pollution on roadside areas and the importance of proper disposal. To recognize the efforts of the group, UDOT erects a sign on that section of roadway with the groups name.

Measurable Goals
Goal - Groups will cleanup roadway segments in the Adopt-A-Highway program 2 times per year.

Staffing
This program is managed by UDOT region staff as follows:
Region 1 - 1 staff member
Region 2 - 1 staff member
Region 3 - 1 staff member
Region 4 - 3 staff members

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Continue to provide the Adopt-A-Highway Litter Removal Program	N/A
2003 - 2008	Provide roadway clean-up efforts two times per roadway segment per year.	Document number of roadway cleanup efforts.

CHAPTER 3

ILLICIT DISCHARGE DETECTION AND ELIMINATION

OBJECTIVE
Detect and eliminate illicit discharges to storm drain systems.

BEST MANAGEMENT PRACTICES
The BMP's in this chapter describe methods to detect and eliminate illicit discharges and improper disposal of pollutants to storm drain systems.

List of BMP's
- Storm Drain Outfall Maps
- Storm Water Outfall Screening
- Encroachment Permits

BMP - Storm Drain Outfall Maps

Objective
Provide a map for each permitted area showing where UDOT storm drain systems outfall to waters of the state.

Description
Each UDOT Region office would prepare one or more maps showing discharge points from storm drain systems to waters of the state. These maps would show discharge locations, outfall size, outfall type and names of water resources that receive storm water from UDOT systems. Maps would be prepared for all areas in the Region that are regulated under UPDES Phase II.

Decision Process
Implementation of this BMP will help to detect illicit discharges to waters of the state. Major outfalls of municipal storm water runoff to waters of the U.S. will be located and shown on appropriate maps. Maps will clearly show the location of the outfall and the receiving water resource. Major outfalls are defined as municipal storm water conveyance facilities with an equivalent size equal to or greater than 36 inches in diameter.

Sources of information for the development of these maps will include project design drawings, UDOT maintenance personnel and field surveys.

Measurable Goals
Goal - Produce storm drain outfall maps for each area regulated under UPDES Phase II by June 2005.

Goal - Add new information to update storm drain outfall maps within 1 month after construction or modification of storm drain outfall structures.

Staffing
Staffing for this BMP includes:

- Region Environmental Engineer
- Region Hydraulics Engineer
- 1 CAD Designer

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
July 2004	Meet with UDOT Maintenance, Design and Hydraulics staff to determine major storm drain outfall locations	N/A
June 2005	Produce a draft storm drain outfall map for major outfalls in areas regulated under UPDES Phase II	Finalize Region storm drain outfall maps
2005 - 2008	Revise maps if new outfalls are	N/A

	constructed or modifications to existing outfalls are made	

BMP - Storm Water Outfall Screening

Objective
Detect illicit discharges to UDOT storm drain systems and determine their sources.

Description
Major outfalls owned and operated by UDOT are inspected and screened for pollutants. Major outfalls are those drainage structures equal or greater than 36 inches in diameter (or equivalent size) that discharge to waters of the state.

Decision Process
Illicit discharges often result in changes in physical and chemical characteristics of water. Many of these characteristics can be observed in the field. Testing and analysis of storm water samples can reveal information about the pollutant type and possible source for enforcement action and elimination of the discharge. Drainage from major outfalls will be inspected, tested and analyzed during dry weather conditions for the following physical and chemical indicators of pollutants:

Physical Characteristics:

- Color
- Odor
- Clarity
- Floatables
- Deposits
- Stains
- Structural Damage

Field Measurements:
- Temperature
- pH

Field Analyses:
- Ammonia
- Surfactants
- Metal Toxicity

A field data sheet will be completed for every outfall inspected. Follow-up activities will be conducted for sites where pollutants indicate possible illicit discharges. Up-stream sites be investigated in further detail to determine the source of the discharge. Findings will be reported to Salt Lake Valley Health Department for action to eliminate the illicit discharge. All enforcement actions taken will be documented.

Staffing
Staffing for this BMP includes:

Region Environmental Engineer
Region Hydraulics Engineer
1 Additional Region Environmental Staff Member

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
February 2006	Develop outfall screening protocol	Approval by the Division of Water Quality
May 2006	Obtain necessary screening equipment	N/A
2006 - 2008	Inspect major outfalls once per year for illicit discharges	Document screening activities and findings

BMP - Encroachment Permits

Objective
Prohibit/eliminate illicit discharges of storm water and pollutants from entering UDOT drainage facilities and right of way.

Description
An encroachment permit is required for the discharge storm water runoff from a private source into a UDOT storm drain system.

When a private development or business requests an encroachment permit to discharge storm water runoff into a UDOT facility, the following activities take place:

- The UDOT Region Hydraulics Engineer (RHE) determines if the existing storm drain system has sufficient capacity.
- The RHE checks the proposal to verify presence of an oil/water separator and floating debris trap.
- The RHE ensures that on-site detention is provided at the development/business and the flow to UDOT's storm drain system is limited to 0.1cfs/acre.
- If the design is satisfactory, the RHE recommends to the Region Permits Officer that an encroachment permit be issued.
- If the design is not satisfactory, the request to discharge into UDOT's system is denied.

Decision Process
Encroachment permits can help prevent/eliminate unauthorized discharges of storm water and pollutants from entering UDOT storm drain facilities and right of way. Failure to obtain an encroachment permit is a violation of UDOT Policy and enforcement actions are taken against those responsible. Enforcement against parties responsible would be accomplished by UDOT, with punitive measures being levied by the local health department with jurisdiction over the area.

Staffing
Staffing for this BMP includes the UDOT Region Hydraulics Engineer and the UDOT Region Permits Officer

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
August 2006	Review Encroachment Permit Language and update or modify as necessary	Approval by Utilities Engineer
2003 - 2008	Implement screening protocol within 2 days after discovery of an illicit discharge	Document screening activities and findings

CONSTRUCTION SITE STORM WATER RUNOFF CONTROL

OBJECTIVE

Provide information and guidance to construction personnel on issues related to storm water quality.

BEST MANAGEMENT PRACTICES

The BMP's in this chapter describe techniques to reduce pollutants in storm water runoff from construction sites. Construction sites that disturb an area greater than or equal to one acre must incorporate the BMP's listed below.

List of BMP's

- UDOT Standard Drawings for Temporary Erosion and Sediment Control (EN1 - EN5)
- UDOT Manual for Temporary Erosion and Sediment Control
- UDOT Storm Water Pollution Prevention Plan
- UDOT Standard Specification titled "Environmental Protection"
- UDOT Environmental Control Supervisor (ECS) Training
- UDOT General Environmental Training
- Stabilized Construction Entrances
- Contractor Rating for Environmental Compliance

BMP - UDOT Standard Drawings for Temporary Erosion and Sediment Control (EN1 - EN5)

Objective
Minimize the discharge of construction site pollutants to storm water conveyance systems.

Description
This BMP consists of standard drawing sheets that describe various temporary erosion and sediment control measures used on UDOT construction and maintenance projects. These drawings describe the necessary elements of each control measure and how each measure is to be constructed. General notes are included for each measure that describe construction practices and issues regarding maintenance.

Temporary Erosion and Sediment Control Measures include:

- Straw or Hay Bale Check Dam
- Stone Check Dam
- Silt Fence
- Slope Drain
- Temporary Berm
- Straw and Hay Bale Drop Inlet Barrier
- Silt Fence Drop Inlet Barrier
- Stone Drop Inlet Barrier
- Sediment Trap
- Curb Inlet Barrier

Strategy
Control measures listed above are designed to trap pollutants in storm water to the maximum extent practicable (MEP) prior to discharge from the construction site. Temporary erosion control measures can reduce erosion and sediment loss by approximately 80%.

Staffing
Staffing for this BMP includes:
Region Environmental Staff
Region Design Staff
Region Construction Staff

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Review/modify Standard Drawings once during permit period	Approval of UDOT Standards Committee
2003 - 2008	Include Temporary Erosion and Sediment Control Drawings on all projects that disturb an area greater or equal than 1 acre in size.	N/A
2003 - 2008	Include Temporary Erosion and Sediment Control Drawings on all projects that drain to an adjacent water of the state, sensitive environmental area or special aquatic site as defined by the US Army Corps of Engineers. (wetland, mudflat, playa, marsh, etc.)	N/A

BMP - UDOT Manual for Temporary Erosion and Sediment Control

Objective
Minimize the discharge of construction site pollutants to storm water conveyance systems.

Description
This BMP consists of a manual that describes various temporary erosion and sediment control measures used on UDOT construction and maintenance projects. This manual is intended to give designers, contractors, installers, and inspectors the tools they need to implement practical and efficient SWPPP's. Each section of this manual includes information on the design, installation, inspection and maintenance of temporary erosion control measures. Proper use of these measures will protect the environment Portions of UDOT Standard Drawings for Temporary Erosion and Sediment Control are included in the manual and the necessary elements of each control measure are described.

Strategy
This manual is a useful tool that is used by design staff and construction staff in developing and modifying storm water pollution prevention plans. It is concise enough that it can be carried from job site to job site with ease. Common problems with erosion/sediment control measures are identified and solutions to these problems are listed.

Staffing
Staffing for this BMP includes one staff member from UDOT Environmental Services Section to oversee production and distribution of the manual.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Update Existing Manual of Instruction once during the permit period	Incorporate comments from environmental staff
2003 - 2008	Distribute latest manual to UDOT construction, maintenance, environmental and design personnel	N/A

BMP - UDOT Storm Water Pollution Prevention Plan (SWPPP)

Objective
Minimize the discharge of construction site pollutants to storm water conveyance systems.

Description
A set of plans are developed that describe temporary and permanent erosion control measures for transportation projects. The SWPPP consists of a summary sheet that describes the project area and the type of control measures planned for the project and supplementary drawings that describe the types and locations of proposed erosion control measures.

Temporary erosion/sediment control measures address project construction activities. Permanent erosion control measures address erosion control throughout the life of the project. This plan will be developed for all projects which will disturb one acre or more. In addition, a SWPPP will be developed for all projects that are adjacent to waters of the state, sensitive environmental areas or special aquatic sites as defined by the US Army Corps of Engineers (wetlands, mudflats, playas, marshes, etc.) regardless of acreage disturbed.

Strategy
Including storm water pollution prevention plans and specifications in contract documents will enable construction staff to provide adequate measures to minimize pollutants from being discharged via storm water runoff.

Measurable Goals
Goal - Provide a SWPPP for all projects that drain to an adjacent water of the state, sensitive environmental area or special aquatic site as defined by the US Army Corps of Engineers. (wetland, mudflat, playa, marsh, etc.)

Staffing
Staffing for this BMP is comprised of:

- Region Landscape Architect
- 2-3 Region Design technicians
- 1-2 Region Design Engineers

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Provide a SWPPP for all projects that drain to an adjacent water of the state, sensitive environmental area or special aquatic site as defined by the US Army Corps of Engineers. (wetland, mudflat, playa, marsh, etc.)	N/A
2003 - 2008	Update UDOT SWPPP Title Sheet once during permit period	Incorporate comments from environmental, design & construction

BMP - UDOT Standard Specification “Environmental Protection”

Objective

Prevent construction site pollutants such as sediment, fuels, oils, bitumens, chemicals or other harmful materials from being discharged to storm water conveyance systems.

Description

This standard specification is applicable to UDOT projects and outlines specific actions to be taken and requirements necessary for environmental protection. Topics covered in this specification include:

- Wetlands
- Flood Plains
- Live Streams
- UPDES Permits
- Environmental Clearances by the Contractor
- Hazardous Materials
- Noise and Vibration Control
- Archeological, Paleontological Discoveries
- Open Burning
- Abrasive Blasting

Strategy

This specification is part of the UDOT Standard Specifications for Road and Bridge Construction. UDOT projects include these standard specifications in the contract documents.

Staffing

Staffing for this BMP is comprised of:

UDOT Standards Committee
1 Staff member of UDOT Environmental Services

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Update the Environmental Protection Specification once during permit period	Approval of UDOT Standards Committee

BMP - UDOT Environmental Control Supervisor (ECS) Training

Objective
Increase protection of environmental resources within and adjacent to UDOT construction sites.

Description
This BMP consists of a training program conducted by UDOT environmental staff, and attended by inspectors and contractors who work on UDOT construction projects. The goal of this training program is to have trainees become certified as Environmental Control Supervisors (ECS).

UDOT requires the contractor to designate an Environmental Control Supervisor (ECS) for selected projects that have 404 Permits, UPDES Permits, Stream Alteration Permits or other sensitive environmental resources.

The responsibilities of the ECS include:
- Inspecting the project site for compliance with UPDES and other environmental permits
- Ensuring that environmental protection measures in the project plans are implemented on the project
- Maintaining temporary erosion and sediment control measures
- Modifying the Storm Water Pollution Prevention Plan as required
- Obtaining additional environmental clearances for off-site work
- Coordinating with the UDOT construction crew's ECS
- Ensuring that environmental mitigation commitments are followed on the project

Strategy
Individuals on construction projects that are trained in a variety of environmental issues and certified as an ECS, will help minimize environmental impacts from construction operations and reduce the discharge of pollutants to environmental resources.

Staffing
Staffing for this BMP includes:
1 staff member from UDOT's Environmental Services
2 staff members from UDOT Region Environmental Division

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Provide ECS Training opportunities at least twice per calendar year	Document the number of training opportunities provided. Retain a list of all who have passed the class
2003 - 2008	Review class materials on a bi-annual basis	Document changes or additions made to course instructional materials

BMP - UDOT General Environmental Training

Objective

Provide instruction and guidance to UDOT project managers, maintenance personnel, construction inspectors and design technicians on environmental issues common to transportation projects.

Description

UDOT Environmental Services provides training to staff on a variety of environmental topics. This training will inform and educate employees on UDOT's environmental ethic and provide the tools necessary to help minimize potential adverse impacts to the natural and built environment.

Environmental topics covered include:

- NEPA Compliance
- Point & Non-Point Source Pollution
- Temporary Erosion/Sediment Control
- Waters of the US, Including Wetlands
- Stream Channel Alterations
- Archeological/Paleontological Resources
- Project Mitigation Commitments
- Air Quality
- Hazardous Materials
- Noise
- Rare, Threatened and Endangered Species
- Invasive Weed Species
- Water Quality Permits

Strategy

Providing training to UDOT staff in a variety of environmental issues, will help provide guidance and educate staff on best management practices to minimize environmental impacts. This training will help reduce the discharge of pollutants to environmental resources.

Staffing

Staffing for this BMP includes:

5 staff members from UDOT's Environmental Services

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Provide environmental training to project managers, maintenance personnel, construction inspectors and design technicians at least once per calendar year.	Document training provided.

BMP - Stabilized Construction Entrances

Objective
Minimize the amount of sediment and mud that may leave a construction site on vehicles.

Description
1. Gravel Pad
A pad of gravel approximately 6 inches thick is placed where construction traffic leaves and enters the construction site. Usually, these locations will occur at access points to local paved roads and highways. A geotextile layer should be placed between the gravel layer and the subgrade. The stabilized entrance should be flared at the intersection to adjacent roadways so that longer vehicles remain on the gravel pad when turning out of or on to the site. When a construction vehicle drives over the gravel pad, sediment and mud are removed from the vehicle's wheels, thereby reducing off-site tracking on to local roads and streets. The size of the gravel should be large enough so that it is not carried away by vehicle traffic but small enough to not be caught between dual wheels. The gravel pad can reduce erosion and rutting at the construction site entrance.

2. Cattle Guard/Metal Grate
A metal grate can be added to the gravel pad measure described above which will enhance the performance of the construction entrance. As vehicles drive over the series of parallel steel bars, soil is dislodged from vehicle tires.

All construction entrances should be maintained until the entire project site has been stabilized. Additional gravel may need to be added in order for the entrance to remain effective. Soil that is tracked off-site should be swept up and properly disposed as soon as possible.

Strategy
Stabilized construction entrances are an effective measure that reduces off-site tracking, dust and sediment discharge to downstream storm water conveyance systems.

Staffing
Staffing for this BMP includes construction crew members and one UDOT inspector.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Provide a stabilized construction entrance on all projects that could cause off-site tracking onto paved roadways and highways.	Document effectiveness and improvements needed
November 2004	Develop a standard specification for Stabilized Construction Entrances	Approval by UDOT Standards Committee

BMP - Contractor Rating for Environmental Compliance

Objective

Increase contractor environmental sensitivity in the construction phase.

Description

UDOT has a rating system that provides an opportunity for UDOT construction staff to comment on contractor performance for each project. Contractor performance is rated by the UDOT resident engineer on quality control/workmanship, traffic control, EEO/labor compliance, organization/supervision, partnering, schedule, public relations and environmental compliance. An overall score of 70 or below (out of 100) is considered failing. If the overall rating score falls below 70, the contractor is no longer pre-qualified to bid on major UDOT projects. A project is considered "major" if the estimated construction cost is likely to exceed $500,000. The rating for environmental compliance includes the following issues:

- Hazardous Waste Requirements
- Air Quality
- Clearances for off-site work
- Invasive Weed Control
- UPDES Permit Requirements
- 404/Stream Alteration Permit Requirements
- Temporary Erosion Control

Strategy

A rating system for contractors gives UDOT management an indication of how they are performing on a variety of issues. It also provides feedback on areas in which the contractor needs additional training and guidance. This system also provides a way to recognize high quality work and preclude those contractors who have done poor quality work from bidding on major UDOT projects.

Staffing

Staffing for this BMP includes 18 UDOT Resident Engineers who oversee projects in the construction phase.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Rate UDOT contractors for each major project.	Document ratings given
2003 - 2008	Review contractor rating system once during the permit period	Document all modifications made.

CHAPTER 5

POST CONSTRUCTION STORM WATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

OBJECTIVE

Provide information and guidance to address storm water runoff from new development and redevelopment projects that disturb areas greater than or equal to one acre.

BEST MANAGEMENT PRACTICES

The BMP's in this chapter describe permanent structural controls and non structural controls to reduce pollutants in storm water runoff from areas of new development and redevelopment.

List of BMP's

- Detention Pond
- Wet Pond
- Grassed Swale
- Filter Strip

BMP - Detention Pond

Objective
Remove sediment in storm water runoff and reduce the quantity of runoff discharged to downstream water resources.

Description
Detention ponds are typically provided for new storm sewer systems prior to discharge to a water resource such as a river, lake, stream or wetland. The purpose of a detention pond is to trap sediment suspended in storm water runoff and to trap floatable debris on the pond surface. Typically, a controlled outlet is provided that allows a rate of storm water release equal to pre-development conditions. Detention ponds need to be sized to allow a 30 minute detention time to allow the majority of suspended solids to settle out prior to discharge.

Strategy
Detention ponds provide a mechanism for removal of sediment pollutants and other debris. This also results in the removal of nutrients, heavy metals, toxic materials and oxygen demanding particles associated with fine sediment. In addition, providing a slow release of storm water out of the pond serves to protect downstream drainage channels from channel erosion and reduces the potential for downstream flooding.

Design staff need to coordinate all detention facilities with the Division of Water Quality regarding treatment and design issues.

Staffing
Staffing for this BMP includes:

1 staff member from Region Environmental
2 staff members from Region Design
1 staff member from UDOT Hydraulics

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	For projects exhibiting the proper site characteristics, provide a detention pond for new storm drain systems that discharge to water resources.	Approval of design by the Department of Water Quality
September 2005	Develop a list of detention pond facilities for monitoring purposes	Distribute list to maintenance personnel
2003 - 2008	Document performance and effectiveness 1 year after installation	Assess performance, document modifications or maintenance needed

BMP - Wet Pond

Objective

The purpose of a wet pond is to remove sediment, biochemical oxygen demand (BOD), organic nutrients and trace metals from storm water.

Description

A wet pond is similar to a detention pond except that it contains a permanent pool of water. Biochemical processes take place within the pond that naturally aid in reducing the quantity of soluble nutrients and heavy metals such as lead and zinc. Wet ponds also offer flood control benefits and removal of floating debris from storm water. Wet ponds need a dependable water source or be located at the ground water level. It may be necessary to provide a clay liner or geotextile if the existing soil has a high rate of permeability. The permanent pool should be approximately 3 to 8 feet deep and should incorporate a floating debris trap before runoff is discharged downstream. The distance between the pond inlet and outlet should be as large a possible to maximize the removal of sediment, organic pollutants and heavy metals. The volume of the pond should be approximately 3 times the first flush from the storm event (approximately ½ inch of rainfall over the impervious surface).

Monitoring studies have shown that wet ponds have achieved the following average pollutant removal efficiencies (Schueler, 1992):

Pollutant	Removal Efficiency
Sediment	74 %
Total Phosphorus	49 %
Total Nitrogen	34 %
Lead	69 %
Zinc	59%

Strategy

Wet ponds are a useful tool because they assist in pollutant removal using both physical and chemical processes. As a result they are more effective that detention ponds, if a constant source of water is available. In addition to fine particles settling out of the runoff, biological activity occurs and vegetation in the pond help to remove nutrients and heavy metals from storm water.

Staffing

Staffing for this BMP includes:

1 staff member from Region Environmental
2 staff members from Region Design
1 staff member from UDOT Hydraulics

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	For projects exhibiting the proper site characteristics, provide a wet pond for new storm drain systems that discharge to water resources.	Approval of design by the Department of Water Quality
October 2005	Develop a list of wet pond facilities	Distribute list to maintenance

	for monitoring purposes	personnel
2003 - 2008	Document performance and effectiveness 1 year after installation	Assess performance, document modifications or maintenance needed

BMP - Grassed Swale

Objective
The objective of a grassed swale is to convey and remove sediment and heavy metals from storm water runoff.

Description
Grassed swales are open channel storm water conveyance systems that are vegetated with grasses. They require relatively flat longitudinal slopes and soils that drain well. The best performance is achieved for storms with moderate runoff, their effectiveness on large storms is limited. They can be effective when used in roadway ditches and medians where sediment loads are expected to be low. Pollutant removal rates are dependent on channel width, longitudinal slope and type of vegetation. The best removal rates have been achieved by using dense turf grass species with a grass blade height of 2 inches above the design water depth. Increasing time of runoff through the swale will increase pollutant removal rates. Check dams can be incorporated in the swale to reduce velocities and aid in sediment removal.

Monitoring studies have shown that 200 foot long grassed swales have achieved the following average pollutant removal efficiencies (Barret et al., Schueler, 1991; Yu, 1993; Yousef, et al., 1985, Horner, 1993):

Pollutant	Removal Efficiency
Total Suspended Solids	74 %
Total Phosphorus	29 %
Total Nitrogen	25 %
Lead	67 %
Zinc	63%
Oil/Grease	75%

Strategy
Grassed swales are a useful tool because they assist in pollutant removal, are aesthetically pleasing and cost effective solutions for conveying and treating storm water runoff. Suspended solids and metals can be reduced by the use of grassed swales. The mechanism of pollutant removal is typically through adsorbtion and sedimentation.

Staffing
Staffing for this BMP includes:

1 staff member from Region Environmental
2 staff members from Region Design
1 staff member from UDOT Hydraulics

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	For projects exhibiting the proper site characteristics, provide grassed swales for channelizing storm water runoff.	N/A

2003 - 2008	Document performance and effectiveness 1 year after installation	Assess performance, document modifications or maintenance needed

BMP - Filter Strip

Objective
The objective of a filter strip is to remove sediment and other pollutants from storm water runoff.

Description
A filter strip is a vegetated section of land, usually between a roadway and a receiving water. They are relatively flat and convey overland (sheet) flow. Filter strips may occur as grasslands, forested areas or any other vegetated surface. They function by intercepting sheet flow and provide a filtering mechanism prior to discharge to the receiving water body. Pollutants are detained and removed by sedimentation, filtration and infiltration into the soil. Filter strips only treat low velocity flows. Flat side slopes (less than 5%) combined with fair soil permeability are found to result in the best performance. Storm water runoff from roadways can be directed to flow through a filter strip prior to being discharged into the receiving water.

Strategy
Filter strips can be useful in rural situations where storm water runoff is allowed to sheet flow and dissipate into the surrounding vegetated areas. Suspended solids and metals can be reduced by the use of filter strips. They can contribute to ground water recharge, reduce erosion, trap sediment, provide good wildlife habitat.

Expected pollutant removal efficiencies (Schueler, 1987) for grassed and forested filter strips are shown below:

Pollutant	Grassed Filter Strip (20' length)	Forested Filter Strip (100' length)
Suspended Sediment	20 - 40 %	60 - 80%
Total Phosphorus	>20 %	40 - 60%
Total Nitrogen	>20 %	40 - 60%
Trace Metals	20 - 40 %	>80%

Measurable Goals
Goal - Provide a filter strip for all projects when suitable conditions exist.

Staffing
Staffing for this BMP includes:

1 staff member from Region Environmental
2 staff members from Region Design
1 staff member from UDOT Hydraulics

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	For projects exhibiting the proper site characteristics, provide filter strips to intercept sheet flow runoff.	N/A

2003 - 2008	Document performance and effectiveness 1 year after installation	Assess performance, document modifications or maintenance needed

CHAPTER 6

POLLUTION PREVENTION/GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

OBJECTIVE

Develop and implement maintenance programs for municipal operations to prevent and reduce pollutants from being discharged to downstream resources.

BEST MANAGEMENT PRACTICES

The BMP's in this chapter describe training and maintenance procedures to reduce pollutants in storm water runoff from municipal operations.

List of BMP's

- Snow Removal and Deicing Practices
- Salt Pile Storage
- Street Sweeping
- Spill Prevention and Response Plan

BMP - Snow Removal and Deicing Practices

Objective
Operate and maintain UDOT roadways and maintenance facilities while incorporating best management practices to reduce the discharge of pollutants to the surrounding environment.

Description
Snow and ice are removed from UDOT roadways to provide a safe transportation system for the traveling public. Snow and ice are removed from traveled lanes, storage lanes, shoulders and gore areas. Several types of snow and ice removal are incorporated:

Anti Icing Technology :
This technology consists of treating the roadway surface with liquid chemicals such as sodium chloride and magnesium chloride to prevent the accumulation of snow and ice. A mixture of salt and water referred to as brine is applied first to roadway surfaces to help prevent the formation of ice. This method is used in the Weber County, Salt Lake County and Utah County urbanized areas. Magnesium chloride is very effective against snow and ice and has fewer adverse effects commonly attributed to salt.

Traditional Snow and Ice Removal Methods:
Plowing is done and ice control materials are applied at a frequency to avoid snow accumulation of 2 inches. In rural areas salt and grit are used to remove ice at a ratio of (2) parts grit to (1) part salt. Grit is not used in the Salt Lake County urbanized area because particulate matter is an air quality concern. Currently, snow plow spreaders are re-calibrated at least twice a year, more often if required.

Remote Weather Information Systems (RWIS) are used on all major interstate highways and major rural arterial roadways. These systems record pavement surface temperatures and other weather information. With this data, maintenance crews can plan ahead and treat roadway surfaces early, before ice accumulates from winter storm events.

Strategy
The practices described above are designed to provide transportation facilities that are free of ice and snow while minimizing the discharge of pollutants to the surrounding environment. A key strategy is to apply only the minimum quantity of deicing agent necessary to remove ice from roadway facilities. UDOT has a Statewide Snow Plan which includes information on current practices regarding snow and ice removal, deicing chemicals, equipment and application techniques

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
July 2005	Update the current UDOT Statewide Snow Plan	Updated Plan Distributed to UDOT Region Maintenance Personnel
2003 - 2008	Re-calibrate snow plow spreaders twice each year	Document re-calibration of equipment

November 2005	Develop a training program for maintenance personnel on snow and ice removal	Document training efforts
2005 - 2008	Provide annual training to maintenance personnel on snow removal and deicing techniques	Document training efforts

Staffing

Staffing for deicing and snow removal include:

640 staff members from 79 maintenance stations
100 staff members and supervisors from the Maintenance Division
7 staff members who will provide training

BMP - Salt Piles and Salt Storage

Objective
Prevent salt from polluting storm water and adversely affecting downstream environmental resources.

Description
Salt is an important material in UDOT's winter road maintenance program. UDOT has approximately 120 stock piles of salt throughout the state. Many existing salt piles are covered, preventing storm runoff from contacting the material. Most salt pile facilities not covered have retention ponds that contain storm water runoff. It is important to prevent salt and brine from migrating to downstream drainage facilities and receiving waters.

Strategy
Excessive quantities of salt can cause adverse impacts to aquatic environments and roadside vegetation. Therefore, it is important to incorporate best management practices to contain salt and salt leachate in order to store this material properly.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2004 - 2008	Cover 4 salt stockpiles per year	Document results

Staffing
Staffing for this BMP includes 640 staff members from 79 maintenance stations.

BMP - Street Sweeping

Objective
Remove particulates and debris from paved roadway surfaces.

Description
All state paved roadways in urbanized and rural areas are swept at least once per year. Material collected is properly disposed of at local landfills. Paved roadways in urban areas are swept approximately 2 times per year.

Strategy
Street sweeping efforts help to remove fine particulate matter and other pollutants before being discharged into storm drain systems and downstream receiving waters.

Staffing
Staffing for this BMP includes 2 personnel from each of 79 maintenance stations.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Provide street sweeping in urban areas 2 times per year	Document street sweeping efforts
2003 - 2008	Provide street sweeping in rural areas once per year	Document street sweeping efforts

BMP - Spill Prevention and Response Plan

Objective

Prevent pollutants from being discharged to downstream receiving waters and adjacent environmental resources.

Description

UDOT is developing a general emergency response/spill response plan that describes regulations, standard policies, procedures, worker safety, responsible parties, incident reporting and record keeping regarding the release of hazardous materials/waste constituents. Key elements of the plan include:

- Identifying the substance
- Shutting off the source
- Eliminating all sources of combustion
- Reporting the incident
- Evacuating the area
- Containing the spill
- Cleaning up and decontaminating the area
- Disposing of hazardous waste substances at an approved facility

Strategy

It is important to have an established set of policies and procedures to provide instruction and guidance in case of hazardous material discharge or spill.

Staffing

Staffing for this BMP is derived from the UDOT Maintenance Division.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Review current spill response procedures once during the permit period.	Document modifications made to current procedures
2003 - 2008	Provide annual training to maintenance personnel regarding spill prevention and response.	Document training provided.

BMP - Herbicide Application

Objective
Apply herbicides in such a manner to reduce to the maximum extent possible, the discharge of pollutants to adjacent areas, drainage facilities and receiving waters.

Description
Maintenance forces selectively apply herbicides to roadside areas within the roadway right way to control undesirable plant species and invasive weed species listed on the Utah State Department of Agriculture's Noxious Weed List and each counties weed list.

Strategy
The UDOT Maintenance Division implements a process that integrates the needs of local communities, visual quality, knowledge of wildlife and plant ecology and various economical methods to manage roadside vegetation. Healthy stands of vegetation resist invasion by noxious weeds, reduce the need for herbicide application and reduce maintenance costs. All personnel who apply herbicides receive approximately 20 hours of specialized training. This training includes the use of the various types of herbicides, calibration of equipment and field instruction. Trainees are supplied with handouts, instruction manuals and reference manuals. Every maintenance station is supplied with plant identification and weed management books. Applicators as well as other interested persons are encouraged to attend the annual Utah Weed Control Conference. UDOT's Roadside Vegetation Manager is continually evaluating the use and effectiveness of various herbicides. It was through this effort, that it was decided to discontinue the use of fertilizers throughout the department.

UDOT is a strong advocate of wildlife habitat preservation. UDOT supports a program called "Roadsides for Wildlife" which advocates leaving a strip of natural vegetation adjacent to the roadway. This program recommends leaving this strip of vegetation partially mowed or un-mowed. This has numerous benefits such as providing habitat for many bird species, reducing erosion and siltation and resisting invasion by noxious weeds. Native grasses, wildflowers and shrubs provide an aesthetically pleasing landscape and are important components of quality wildlife habitat.

Staffing
Staffing and equipment resources are derived from the maintenance division and supervised by the Roadside Vegetation Manager.

Measurable Goals and Implementation Schedule

Milestone/Year	Goal/Action	Assessment
2003 - 2008	Provide annual training on latest best practices and herbicide application techniques	Document training efforts
2003 - 2008	Evaluate the use and effectiveness of existing and new herbicide products on an annual basis.	Document findings and distribute recommendations

APPENDIX 1

EN Series Standard Drawings for Temporary Erosion Control

http://www.udot.utah.gov/main/f?p=100:pg:11173642162179741000::1:T,V:1104
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APPENDIX 2

UDOT Temporary Erosion and Sediment Control Manual

http://www.udot.utah.gov/main/f?p=100:pg:11173642162179741000:::1:T,V:288,

APPENDIX 3

UDOT Storm Water Pollution Prevention Plan Outline

http://www.udot.utah.gov/main/f?p=100:pg:11173642162179741000:::1:T,V:288,

APPENDIX 4

UDOT Standard Specification 1355 titled “Environmental Protection

http://www.udot.utah.gov/main/f?p=100:pg:11173642162179741000:::1:T,V:1100
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